

Two new *Fusinus* from East Africa (Gastropoda: Fascioliariidae)

Dos nuevos *Fusinus* de África oriental (Gastropoda: Fascioliariidae)

Roland HADORN* and Koen FRAUSSEN**

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ABSTRACT

Fusus? *retiaris* von Martens, 1901 is recognized as a valid species, placed in the genus *Fusinus* Rafinesque, 1815 by radular evidence and compared with *Fusinus articulatus* (Sowerby, 1880). A lectotype is selected. Previously known only from Somalia, its range is now extended to southwestern Madagascar. *Fusinus jurgeni* sp. nov. and *Fusinus virginiae* sp. nov. are described as new to science. *F. jurgeni* sp. nov. is compared with *F. subangulatus* (von Martens, 1901) and *F. bradneri* (Drivas and Jay, 1990). *Fusinus virginiae* sp. nov. is compared with *Pseudolatirus pallidus* Kuroda and Habe in Habe, 1961.

RESUMEN

Fusus? *retiaris* von Martens, 1901 se reconoce como especie válida incluida en el género *Fusinus* Rafinesque, 1815 por caracteres radulares, y se compara con *Fusinus articulatus* (Sowerby, 1880). Se define un lectotipo. Conocida solamente de Somalia, su área de distribución se extiende ahora hasta el sudoeste de Madagascar. *Fusinus jurgeni* sp. nov. y *Fusinus virginiae* sp. nov. se describen como nuevas especies. *F. jurgeni* sp. nov. se compara con *F. subangulatus* (von Martens, 1901) y *F. bradneri* (Drivas y Jay, 1990). *Fusinus virginiae* sp. nov. se compara con *Pseudolatirus pallidus* Kuroda y Habe in Habe, 1961.

KEY WORDS: Fascioliariidae, *Fusinus*, *Pseudolatirus*, Mozambique Channel, Madagascar, Indian Ocean, new species.

PALABRAS CLAVE: Fascioliariidae, *Fusinus*, *Pseudolatirus*, Canal de Mozambique, Madagascar, Océano Índico, especies nuevas.

INTRODUCTION

Commercial trawlers, shrimpers based in western Madagascar, recently started operating in the Mozambique Channel. As a by-product, many shells were collected and mainly offered to collectors by Italian dealers. In an ongoing study of the lower bathyal fusi-

nids we compare these shells with other Indo-Pacific material stored in Muséum national d'Histoire naturelle (Paris, France), Museum für Naturkunde (Berlin, Germany), and The Natural History Museum (London, Great Britain), with material collected offshore

* Schuetzenweg 1, CH-3373 Roethenbach, Switzerland. e-mail: fusinus@bluewin.ch <http://www.fusinus.ch.vu>

** Leuvenestraat 25, B-3200 Aarschot, Belgium. e-mail: koen.fraussen@pandora.be

of Somalia by fishermen from Djibouti and with other material in private collections. We recognize *Fusus? retarius*, a species not reported since its original description by von Martens in 1901 (MARTENS, 1901). The radula is typically fusinid and we place this species in the genus *Fusinus*. Two species offered to collectors under the names *Fusinus cf. bradneri* and *Pseudolatirus pallidus* are both recognized as being different and described as new. A report on all East African deep water fusinids is only useful in the context of a larger study of all Indo-Pacific bathyal *Fusinus*, which is beyond the scope of this paper.

MATERIALS AND METHODS

The present study is essentially based on material collected by R. von Cosel by the commercial trawler *Mascareignes III* in 1986, the type material collected off East Africa by R.V. *Valdivia* in 1898-1899 and described by von Martens, as well as on material recently obtained as a by-product of commercial shrimp fisheries in the Mozambique Channel off Madagascar.

SYSTEMATICS

Family FASCIOLARIIDAE Gray, 1853 Genus *Fusinus* Rafinesque, 1815

Fusinus Rafinesque, 1815: 145. Substitute name for '*Fusus* Lamarck' [= *Fusus* Bruguière, 1789], non *Fusus* Helbling, 1779.

Type species: *Murex colus* Linnaeus, 1758, by typification of replaced name.

Fusinus retarius (von Martens, 1901) (Figs. 3-8, 21)

Fusus? retarius von Martens, 1901. Neue Meer-Conch. deut. Tiefsee-Exp. Leit. Prof. Chun. Sitz.-Ber. Ges. Nat. Freunde Berlin, 1901: 22.

Fusus? retarius von Martens, 1901. Von Martens, 1904. Die beschalten Gastr. deut. Tiefsee-Exp. 1898-1899. Wissensch. Ergeb. Deut. Tiefsee-Exp. Dampfer „*Valdivia*“ 1898-1899, 7 (1), part A: 104-105, pl. 2, fig. 4.

Type material: Lectotype ZMB 61012, *Valdivia* stn 256 (38.5 × 15.7 mm, dd), designated herein (Figs. 3-4). – 1 paralectotype ZMB 61013, *Valdivia* stn 256 (41.2 × 17.6 mm, lv subad).

F. retarius is a variable species, even within the two syntypes, and to avoid confusion in the future we designate the specimen figured by von Martens (1904: pl. 2, fig. 4) (ZMB 61012) as the lectotype of *F. retarius*.

The method of VERDUIN (1977) was employed to count the number of protoconch whorls.

Abbreviations:

BMNH The Natural History Museum,
London, Great Britain

KBIN Koninklijk Belgisch Instituut
voor Natuurwetenschappen, Brus-
sels, Belgium

MNHN Muséum national d'Histoire
naturelle, Paris, France

NM Natal Museum, Pietermaritz-
burg, South Africa

NMBE Naturhistorisches Museum Bern,
Switzerland

NSMT National Science Museum,
Tokyo, Japan

SMNH Swedish Museum of Natural
History, Stockholm, Sweden

ZMB Museum für Naturkunde (Zool.
Museum), Berlin, Germany

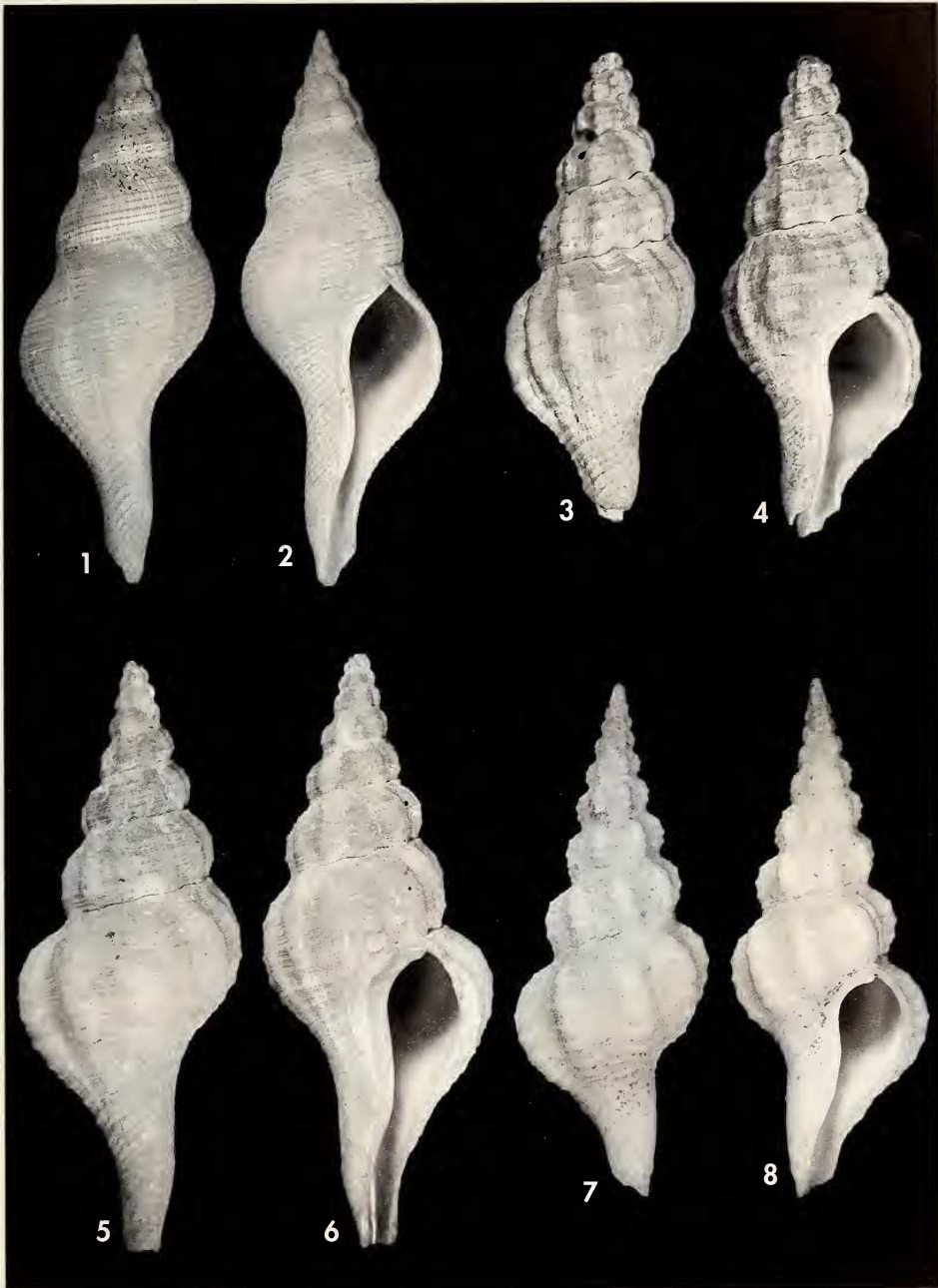
KF Collection Koen Fraussen, Aarschot,
Belgium

RH Collection Roland Hadorn, Röthen-
bach, Switzerland

dd dead collected specimen

lv live collected specimen

subad subadult specimen



Figures 1, 2. *Fusinus bradneri* (Drivas and Jay, 1990), RH, Reunion, off Saint-Gilles, 57.2 mm.
 Figures 3-8. *Fusinus retiarius* (von Martens, 1901). 3, 4: Lectotype ZMB 61012, south Somalia,
 northern Brawa, 38.5 mm; 5, 6: RH, west Madagascar, off Morondava, 56.7 mm; 7, 8: RH, west
 Madagascar, off Morondava, 46.6 mm.

Figuras 1, 2. Fusinus bradneri (Drivas y Jay, 1990), RH, Reunion, frente a Saint-Gilles, 57,2 mm.
Figuras 3-8. Fusinus retiarius (von Martens, 1901). 3, 4: Lectotipo ZMB 61012, Somalia sur, Brawa
norte, 38,5 mm; 5, 6: RH, Madagascar oeste, frente a Morondava, 56,7 mm; 7, 8: RH, Madagascar
oeste, frente a Morondava, 46,6 mm.

Type locality: South Somalia, northern Brawa (near Mogadisho), Valdivia stn 256, 1° 49' N, 45° 29' E, 1134 m.

Material examined: Lectotype and paralectotype in ZMB. – West Madagascar, Tulear, collected by commercial trawlers, 500-800 m, 5 dd, B. Briano. – West Madagascar, off Morondava, collected by commercial trawlers, 600 m, 3 dd, RH; 1 dd, KF.

Redescription: Shell small for genus (up to 56.7 mm), fusiform, uniformly white, thick and solid, spire high, siphonal canal relatively short. About 10 convex whorls. Suture incised, slightly wavy according to axial sculpture.

Protoconch white, glossy, bulbous, smooth, consisting of 1.0-1.25 convex whorls. Transition to teleoconch slightly eroded in all available specimens but some fine axial riblets still visible. Diameter 0.8 mm.

7 or 8 prominent axial ribs on upper whorls, 8-10 on penultimate and 9-13 on body whorl. Ribs broad, reaching from suture to suture on all teleoconch whorls, separated by wide interspaces, which are as broad as ribs. Axial ribs sometimes becoming slightly weaker and narrower on penultimate and/or body whorl, but again strong and more prominent towards aperture. Prelabral rib being the strongest in adult specimens.

Teleoconch beginning with 3 strong rounded spiral cords and a slightly weaker one just above suture. An intercalated fine thread appears between primary cords and below suture on second or third postnuclear whorl. From fourth whorl on, additional fine intercalated threads of unequal strength appear between the existing cords. Their number increases by intercalation to 6-11 on body whorl. Axial growth lines well-visible on all whorls

Aperture ovate, white, pinched at both ends. Outer lip simple and smooth, internal side smooth or sculptured with some weak glossy teeth near transition to siphonal canal. Inner lip smooth, glossy, appressed to parietal wall, attached. Adult specimens sometimes with a fine inconspicuous riblet on columellar callus, not corresponding to underlying spiral sculpture, but not present on columella inside upper whorls of shell. A simple small white tooth on upper end of parietal callus. Columellar folds

absent. Siphonal canal rather short, as long as aperture, strongly curved, rather broad, open. Outer side sculptured with close-set spiral cords and intercalated threads of unequal strength.

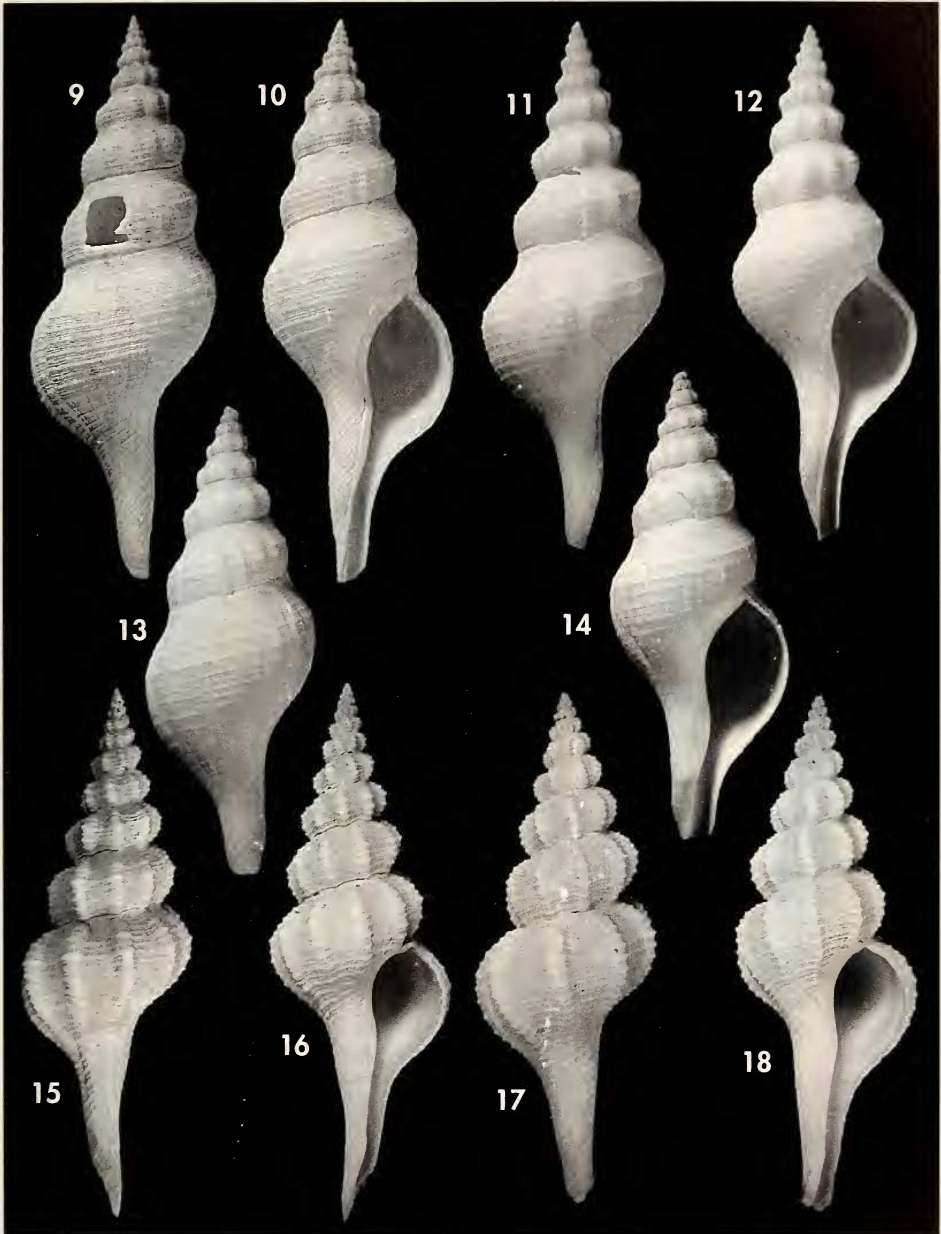
Operculum typical of genus, corneous, red-brown, shape and size corresponding to aperture, rounded above and pointed below, with terminal nucleus.

Periostracum thin, yellowish, producing fine short hairs when growth lines cross spiral sculpture.

Radula (Fig. 21) typical of genus. Central tooth elongated, tricuspid, cusps strong, short, broad and pointed; median cusp strongest. Lateral teeth short, strongly curved, consisting of 5 relatively short, pointed cusps and a small denticle at inner side. Outermost cusp largest with conspicuously broad base, followed by 3 relatively small ones; innermost again stronger with broad base.

Range and habitat: East African coast, from southern Somalia to southwestern Madagascar. Bathymetric range between 500 and 1134 m.

Comparison: The generic position of *F. retiarius* was already uncertain in the original description, and this species was, until recently, only known from the original material. No further material became available for additional study and the validity of the species could not be confirmed. While studying the type material in ZMB we recognized some of the recently trawled material from Mozambique Channel as belonging to this taxon. The fine inconspicuous riblet on the columellar callus is much finer than a typical columellar fold, and is not visible in subadult specimens nor on the columella of the upper whorls inside the shells which we forced open. Therefore we cannot consider it as being a columellar fold as e.g. in *Laticirus* Montfort, 1810 and *Pseudolatirus* Bellardi, 1884. The radula is figured for the first time (Fig. 21) and is typical of the genus, confirming the placement in *Fusinus*.



Figures 9-14. *Fusinus jurgeni* sp. nov.. 9, 10: Holotype MNHN, southwest Madagascar, 94.2 mm; 11, 12: Paratype MNHN, southwest Madagascar, Tulear, 83.4 mm; 13, 14: KF 1631, Somalia, between Ras Hafun and Djibouti, 77.2 mm. Figures 15-18. *Fusinus virginiae* sp. nov.. 15, 16: Holotype MNHN, southwest Madagascar, Mozambique Channel, 59.0 mm; 17, 18: Paratype NM L5694/T1876, southwest Madagascar, Mozambique Channel, 52.5 mm.

Figuras 9-14. Fusinus jurgeni sp. nov.. 9, 10: Holotipo MNHN, SO Madagascar, 94,2 mm; 11, 12: Paratipo MNHN, SO Madagascar, Tulear, 83,4 mm; 13, 14: KF 1631, Somalia, entre Ras Hafun y Djibouti, 77,2 mm. Figuras 15-18. *Fusinus virginiae* sp. nov.. 15, 16: Holotipo MNHN, SO Madagascar, Canal de Mozambique, 59,0 mm; 17, 18: Paratipo NM L5694/T1876, SO Madagascar, Canal de Mozambique, 52,5 mm.

F. retarius can be characterized and distinguished from other rather small *Fusinus* by the uniformly white coloured, solid and thick shell, the strong axial ribs covering all whorls and the stronger prelabral axial rib, the three prominent primary spiral cords on upper whorls and the numerous (up to 11) intercalated fine threads of different strength, by the short and strongly curved siphonal canal, and by the usually relatively strong tooth/teeth inside aperture at lower end of outer lip.

F. retarius is bimorphic for unknown reason. No intermediates were found. We have no clue whatever can cause the bimorphic appearance of *F. retarius*. We

tentatively exclude sexual dimorphism for the reason we never noticed this in other *Fusinus* species. The first form has a broader spire angle and a gradually increasing whorl diameter (Figs. 5-6), the second form has a slender spire and a conspicuously ventricose body whorl (Figs. 7-8).

F. articulatus (Sowerby, 1880), known only from the holotype [BMNH 1900.2.13.4, type locality unknown], is similar in shape and sculpture, but can be distinguished by the larger adult size (78 mm), the concave shoulder slope, the longer, more slender siphonal canal, and the tiny orange-tan markings on the spiral cords. The holotype was well-figured by KAICHER (1986: card no. 4725).

Fusinus jurgeni sp. nov. (Figs. 9-14, 20)

Fusinus subangulatus (von Martens, 1903) "broad form". Hadorn and Fraussen, 1999. Rediscovery of *Fusinus subangulatus* and descr. of a new Somalian *Fusinus*. *Vita Marina*, 46 (3-4): 115, pl. 2, figs. 9-10; 116.

Fusinus cf. *bradneri* Drivas and Jay, 1990. Mallard, 2001. Survey into Fasciariidae. *Xenophora*, 95: 12, fig. 12.

Type material: Holotype (94.2 x 31.7 mm, lv) and one paratype (83.4 x 30.1 mm, dd) in MNHN, 5 paratypes in NM L5693/T1875 (89.7 x 32.6 mm, dd), KF (84.0 x 30.4 mm, dd), RH (89.1 x 31.0 mm, 76.5 x 26.6 mm, both dd), B. Rogers (90.5 x 32.2 mm, dd).

Type locality: Southwest Madagascar, Mozambique Channel, 22° 22' S, 43° 03' E, 530 m.

Material examined: The live-taken holotype, collected by R. von Cosel during a shrimp stock survey by the commercial trawler *Mascareignes III* in 1986. - Madagascar, southwest Madagascar, Tulear, 500-800 m, collected by commercial boats, 5 paratypes MNHN, NM L5693/T1875, KF, RH; 4 dd, B. Briano; 1 dd, RH. - Southwest Madagascar, off Tulear, deep water, 1 dd, paratype B. Rogers. - West Madagascar, off Morondava, 600 m, 3 dd, KF 3208. - Somalia, trawled between Ras Hafun and Djibouti, 400 m, 1 dd, KF 1631.

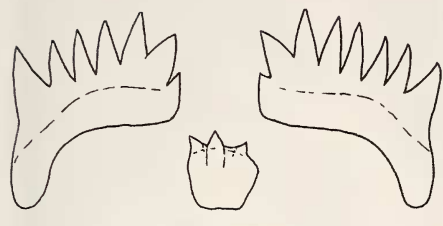
Etymology: This species is dedicated to Jurgen Fraussen, cousin and friend of the second author. He died by gunfire on 3 October 1993 during his mission in Kismaayo, Somalia. The first specimen known to us was collected off Somalia.

Description: Shell large (up to 100.1 mm), fusiform, light in weight, spire elongate, siphonal canal relatively long. 11 or 12 convex whorls, latter whorls often slightly keeled, shoulder slope concave. Shell uniformly white, sometimes with reddish brown tinged spiral cords and with some weak reddish brown axial strikes.

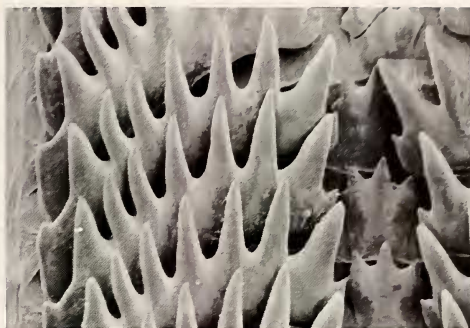
Protoconch typically fusinid, consisting of 1.0-1.25 smooth glossy whorls. Diameter 0.9-1.0 mm. Transition to teleoconch eroded and details not recognizable.

Eight or nine rather narrow and weak axial ribs on three uppermost teleoconch whorls, extending from suture to suture. 8-10 axial ribs on following whorls, withdrawing from upper suture. On penultimate whorl, axial sculpture weak or absent. Body whorl without axial sculpture. Interspaces narrow on upper whorls, slightly broader and less pronounced on latter whorls.

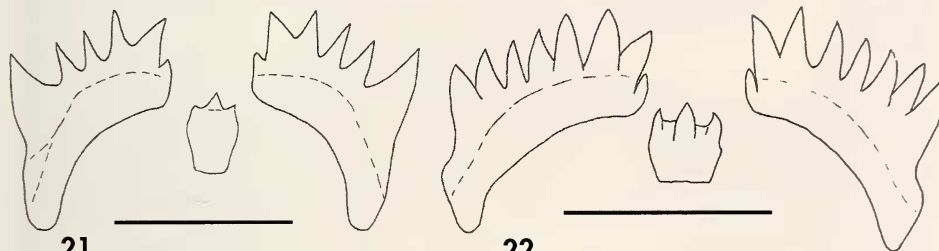
Spiral sculpture crossed by strong, curved axial growth lines. 3 strong spiral cords on first teleoconch whorl,



19



20



21

22

Figures 19-22. Radulae. 19: *Fusinus virginiae* sp. nov.; 20: *Fusinus jurgeni* sp. nov.; 21: *Fusinus retiarius* (von Martens, 1901); 22: *Pseudolatirus pallidus* Kuroda and Habe in Habe, 1961. Scale bars 100 μ m.

Figuras 19-22. Rádulas. 19: *Fusinus virginiae* sp. nov.; 20: *Fusinus jurgeni* sp. nov.; 21: *Fusinus retiarius* (von Martens, 1901); 22: *Pseudolatirus pallidus* Kuroda y Habe en Habe, 1961. Escalas 100 μ m.

the uppermost weaker. From second whorl on, a fine intercalated secondary spiral thread appears. From fifth or sixth whorl on, secondary spirals becoming as strong as primary ones and additional fine tertiary spiral threads appear. On latter whorls 3-5 intercalated fine threads visible between stronger spirals.

Aperture rather large, ovate, upper end pointed, white coloured. Outer lip simple and smooth, without internal lirae. Inner lip completely smooth, curved. Parietal callus thin, parietal wall covered with an extended adherent layer of callus. Columellar folds absent. Siphonal canal almost straight or slightly curved, as long as aperture.

Operculum typically fusinid, corneous, ovate, pointed below, dark brown, shape and size corresponding to aperture, with terminal nucleus. Outer side ornamented with strong concentric

growth lines; inner side with a strongly callused edge along the outer side.

Periostracum unknown.

Radula (Fig. 20) typical of genus. Central tooth almost rectangular in shape; base slightly convex, top straight or slightly concave, both sides concave, tricuspid, with strong short pointed cusps projecting below base. Lateral teeth elongate, curved, with 7 strong, long, pointed cusps. Both ends with a small denticle.

Range and habitat: Known from southwestern Madagascar, between 500 and 800 m deep. One live-collected specimen, 530 m deep. One record (Figs. 13-14) from Somalia, collected between Ras Hafun and Djibouti, 400 m deep (KF 1631).

Comparison: *F. jurgeni* was recently offered to collectors under the name *F. cf. bradneri*, but *F. bradneri* (Drivas and Jay, 1990) (Figs. 1-2) [Holotype MNHN, type locality: west coast of Reunion Island, St.

Paul's Bay, in 750 m] differs by its smaller size, the more solid and reddish brown coloured shell, the less constricted suture, the broad and strong axial ribs on upper whorls, the strong close-set lirae inside the aperture, and by having a smaller number of intercalated fine threads between the stronger spiral cords.

F. subangulatus (von Martens, 1901) [Lectotype ZMB 59931, type locality: south Somalia, near Kismaayo, in 977 m] has a somewhat smaller and heavier shell, a smaller number of whorls, a more slender shape, a shorter siphonal canal and stronger spiral sculpture with a smaller number of spiral cords.

Fusinus virginiae sp. nov. (Figs. 15-19)

Type material: Holotype (59.0 x 19.8 mm, lv) and 1 paratype (40.6 x 15.6 mm, dd) in MNHN, 4 paratypes in NM L5694/T1876 (52.5 x 19.0 mm, lv), RH (52.7 x 18.4 mm, lv), KF (50.6 x 17.2 mm, dd), ZMB (51.1 x 18.2 mm, dd).

Type locality: Southwest Madagascar, Mozambique Channel, 22° 10' S, 43° 05' E, 525 m.

Material examined: Holotype and 3 paratypes (MNHN, NM L5694/T1876, RH) from the type locality, 1 paratype KF from southwest Madagascar, 22° 27' S, 43° 05' E, 530 m, collected by R. von Cosel during a shrimp stock survey by the commercial trawler *Mascareignes III* in 1986. - West Madagascar, Tulear, trawled by commercial boats in 400-800 m, 1 dd, RH; 1 dd, B. Briano; 1 paratype ZMB. - Somalia, Ras Hafun, trawled by commercial boat, deep water, 1 dd, KF.

Etymology: This species honours Ms Virginie Héros for her work in processing the MNHN material.

Description: Shell elongate fusiform, of medium size (49.0-60.0 mm), uniformly white, consisting of 11 or 12 strongly convex whorls. Suture constricted, wavy according to axial sculpture.

Protoconch consisting of about 1.75 whorls, whitish, first whorl small, second whorl broader. Upper part smooth and glossy, final part (about 0.25 whorls) sculptured with about 4 or 5 fine curved axial riblets. Diameter: 0.7-0.8 mm.

Eight or nine strong but narrow axial ribs on uppermost postnuclear whorls, 7 or 8 on following, 8 or 9 on penultimate and 10 or 11 on body whorl. Axial sculpture extending from suture to suture on all whorls. Interspaces deep and broad: on upper teleoconch whorls as broad as the ribs or slightly narrower, on latter whorls nearly twice as broad.

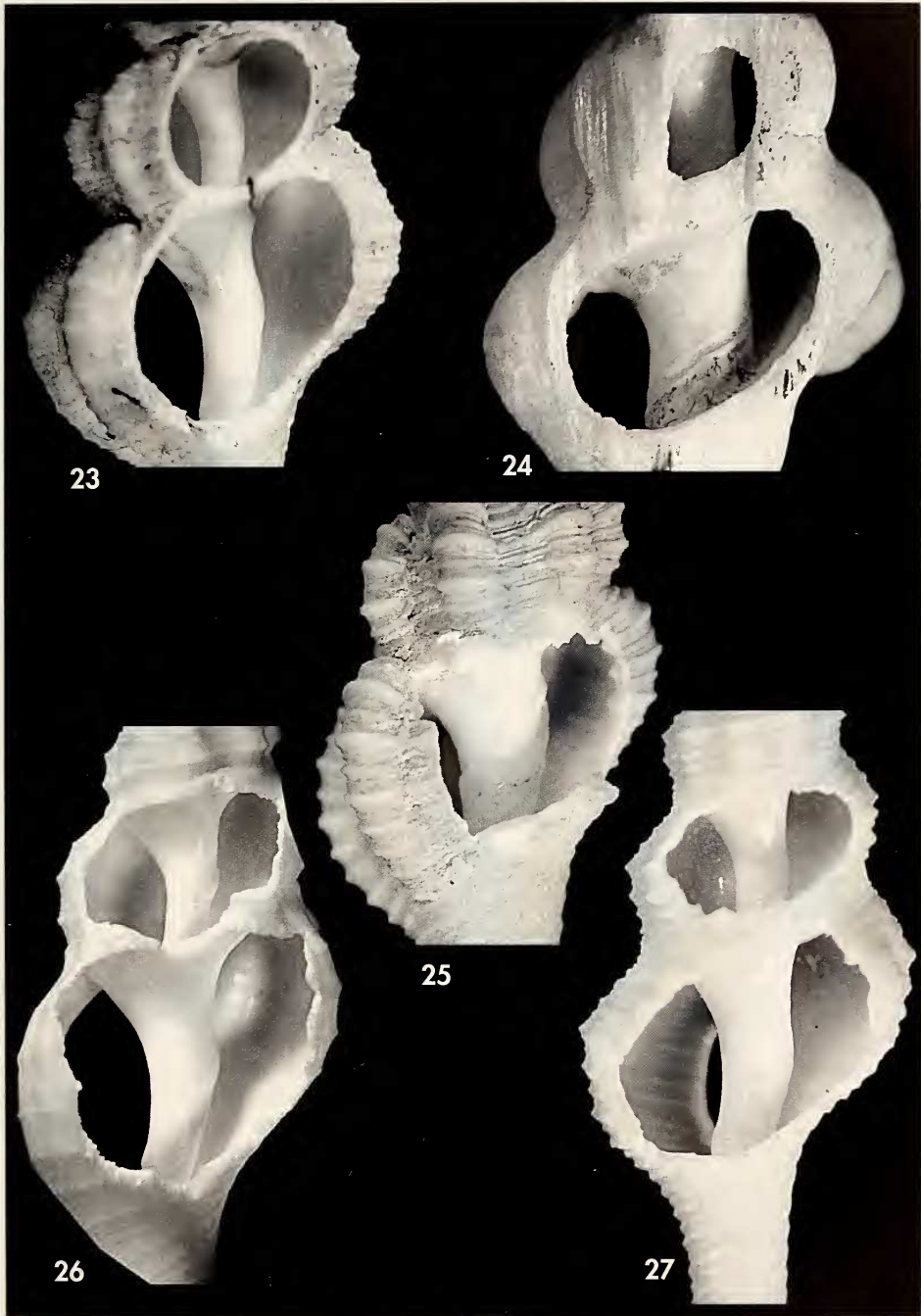
Teleoconch beginning with 3 or 4 strong spiral cords, uppermost one weakest. Peripheral cord the strongest on all whorls. From second whorl on, a somewhat weaker secondary thread appears between each pair of primary cords. From fourth whorl on, a very fine tertiary thread appears at both sides of the secondary threads. The number of tertiary threads increases by intercalation

to 3-5 of unequal strength. Spirals stronger when crossing axial ribs. Fine growth lines produce tiny granules when crossing spiral sculpture. Siphonal canal ornamented with fine regularly spaced spirals and intercalated fine threads.

Aperture white, nearly round, rather small, pinched at both ends. Edge of outer lip strongly convex, with fine crenulation corresponding to external shell sculpture. Internal side smooth or with some weak, close-set internal lirae, which form a row of fine teeth somewhat behind the edge of the outer lip. Two lowermost teeth often conspicuously strong. Parietal callus smooth, curved, appressed to parietal wall, attached. A small, simple tooth on upper end of aperture. Columella smooth, or with 1 or 2 weak, inconspicuous ridges, or with 1 or 2 rows of fine teeth, more or less corresponding to underlying spiral sculpture of preceding whorl. Siphonal canal almost straight, strong, tapering anteriorly.

Operculum corneous, reddish brown, shape and size corresponding to aperture. Upper side rounded, pointed below, with terminal nucleus.

Periostracum greenish brown, velvety, rather thick.



Figures 23-27. Columellae. 23: *Fusinus virginiae* sp. nov.; 24: *Latirus nodatus* (Gmelin, 1791); 25: *Fusolaturus kurodai* (Okutani and Sakurai, 1964); 26: *Pseudolaturus discrepans* Kuroda and Habe in Habe, 1961; 27: *Fusinus colus* (Linnaeus, 1758).

Figuras 23-27. Columelas. 23: *Fusinus virginiae* sp. nov.; 24: *Latirus nodatus* (Gmelin, 1791); 25: *Fusolaturus kurodai* (Okutani y Sakurai, 1964); 26: *Pseudolaturus discrepans* Kuroda y Habe en Habe, 1961; 27: *Fusinus colus* (Linnaeus, 1758).

Radula (Fig. 19) typical of genus. Central tooth tricuspid, cusps short, broad and pointed. Lateral teeth strongly curved, consisting of 6 or 7 subequal strong pointed cusps and with a small denticle at inner side. Outermost and innermost cusps strongest.

Range and habitat: Western Madagascar, Mozambique, alive 525 m deep. One shell from Somalia, trawled by commercial fishing boat.

Comparison: *Pseudolatirus pallidus* Kuroda and Habe in Habe, 1961 [Holotype NSMT-40378, type locality: Japan, Shikoku, off Cape Ashizuri] resembles *F. virginiae*, but differs by the usually larger adult size, the broader spire, the more ventricose whorls, the stronger spiral sculpture, the differences in protoconch morphology (2.5-2.75 whorls, final part (0.5 whorls) with 7 or 8 riblets, red-brown to dark brown, diameter 0.9-1.0 mm) and by the slightly different radula (Fig. 22) (Central tooth nearly rectangular with more prominent median cusp and the slightly incurved tips of both outer cusps. Lateral teeth somewhat broader.).

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The fine inconspicuous ridges on the columellar callus are finer than typical columellar folds. In subadult or juvenile specimens, and inside the shells which we forced open, the columella shows only a smooth, slightly raised edge, hardly visible (Fig. 23) compared to other fasciolarid genera with columellar folds (e.g. *Latirus* Montfort, 1810 (Fig. 24), *Fusolatirus* Kuroda and Habe in Kuroda, Habe and Oyama 1971 (Fig. 25), *Pseudolatirus* Bellardi, 1884 (Fig. 26), *Fasciolaria* Lamarck, 1799). Therefore we cannot consider it as being a columellar fold. A slightly raised edge on the columella can be observed in many typical *Fusinus* species, e.g. in *F. ansatus* (Gmelin, 1791), *F. caparti* (Adam and Knudsen, 1955), and even in the type species *F. colus* (Linnaeus, 1758) (Fig. 27).

Fusinus guidonis Delsaerd, 1995 [Holotype KBIN Nr. 469, type locality: off Mogadisho, Somalia] differs by the slightly smaller size, the smaller number of whorls, the broader spire angle, the conspicuously lightweight and translucent shell, the widely spaced and stronger primary spiral cords and the finer intercalated spiral threads.

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